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NOTEWORTHY RECORDS FROM DARE AND TYRRELL COUNTIES, NORTH CAROLINA

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ABSTRACT

Dare and Tyrrell counties, North Carolina, were inventoried in 2012-13 for natural areas and rare species. New county records and recent collections of scarce taxa are documented here (89 taxa). These records improve understanding of the distribution of the flora of North Carolina.

Since the landmark publication of the Manual of the Vascular Flora of the Carolinas by A.E. Radford, H.E. Ahles, and C.R. Bell (1968), botanical exploration and documentation have continued apace. The Coastal Plain, comprising roughly 45% of North Carolina, has been the subject of many papers and graduate theses documenting the region's flora. Among them are a number which treat portions of Dare and Tyrrell counties: Brown (1959), Burk (1961), Clark et al. (in press), Crutchfield (1964), Faucette et al. (in prep.), Gaddy (1985), Krings (2010), Levy (1976), Sorrie (2014a, 2014b), and Stalter and Lamont (1997).

Dare and Tyrrell counties are situated at the eastern end of the Albemarle Peninsula in northeastern North Carolina, surrounded on three sides by large estuaries locally called sounds (Figs. 1 and 2). Because of the lengthy barrier beach/dune/marsh system of the Outer Banks and the large number of maritime microhabitats, Dare County is acknowledged as a critical meeting ground of northern and southern flora and fauna and is critical to the state's biodiversity (Sorrie 2014a). The vast peatlands of mainland Dare County and adjacent Tyrrell County harbor a whole suite of natural communities and species absent from the barrier islands (McDonald & Ash 1981; Peacock & Lynch 1982; Sorrie 2014a, 2014b). Between them, the two counties harbor about 1000 vascular species and major infraspecific taxa, about 25% of the state flora. While this number is modest compared to most counties of the North Carolina Coastal Plain, Dare and Tyrrell harbor a significant number of local, regional, and state rarities, including 62 state-listed rare plant species in Dare and 19 in Tyrrell (Gadd & Finnegan 2012).

METHODS

The author conducted natural areas inventories of Dare and Tyrrell counties in 2012-13, which included two complete field seasons (Sorrie 2014a, 2014b). During the course of this work, emphasis was placed on locating and assessing the best remaining natural areas, including exemplary or rare natural communities, rare plants, and rare animals. Critical to this effort was a review of previous documents pertaining to the floristics and natural history of these counties. Many previously reported specimens were checked for correct determination at CAHA, DUKE, NCSC, and NCU.

Nomenclature follows Weakley (2012). For each taxon, the first known collection is cited; county of collection is Dare unless stated to be Tyrrell. Capitalized habitat descriptors are natural communities described in Schafale (2013). Specimens at Cape Hatteras National Seashore herbarium (CAHA) are each assigned a unique accession number by the National Park Service, provided here, so that even a specimen without a collector's number can be uniquely identified. "NCNHP database" is the official repository of rare species data at the North Carolina Natural Heritage Program in Raleigh.

Figure 1. Towns and major roads in Dare County, North Carolina.

Figure 2. Towns and major roads in Tyrrell County, North Carolina.

The following symbols are used throughout this paper.

+ = new to Dare County (per Radford, Ahles, and Bell range maps).
***** = new to Tyrrell County (per Radford, Ahles, and Bell range maps).
$ = on North Carolina Rare Plant List (Gadd & Finnegan 2012).
# = on North Carolina Watch List (Gadd & Finnegan 2012).

RESULTS

AIZOACEAE

$ *Sesuvium maritimum* (Walt.) B.S.P. First known collection: Pea Island, dune depression ¾ mi S of Oregon Inlet, 25 Aug 1953, *Radford* (NCU). Given the large amount of suitable habitat on the Outer Banks, this species is unaccountably scarce and is on the NC rare list. A large population occurs on wet sandy flats at the interface between oligohaline marsh and impoundment pond at Pea Island National Wildlife Refuge (*Sorrie 13220* CAHA, NCSC, NCU). Dare County is the species' northern range limit.

APIACEAE

+ *Sanicula canadensis* L. var. *floridana* (Bickn.) H. Wolff. First known collection: Cape Hatteras, shady sandy soil, Jun-Jul 1898, *Ashe s.n.* (NCU). Based on material at NCU and NCSC, all Outer Banks specimens of this species prove to be this variety, which differs from the nominate in its smaller basal leaves and longer spines on leaf margins. A recent collection is from Buxton Woods, 11 Jun 2012, *Sorrie 12993* (NCU). This plant occurs in scattered small populations in Maritime Deciduous Forest and Maritime Evergreen Forest in Buxton Woods, Nags Head Woods, and Kitty Hawk Woods.

+ *Sanicula marilandica* L. First known collection: Nags Head Woods, Sep 1950, *Fox & Godfrey 2318* (NCSC). Recent collections are from Maritime Deciduous Forest at Nags Head Woods: *Krings 728 and 1082* (NCSC) and *Sorrie 13283* (NCU). In North Carolina, it is disjunct from Jones and Wake counties, a minimum of 160 km.

ASTERACEAE

Bidens discoidea (Torrey & Gray) Britt. First known collection: Nags Head Woods, Sep 1950, *Godfrey & Fox 51030* (NCSC). It has not been seen there since, but has been found to be locally numerous in Maritime Swamp Forest at Kitty Hawk Woods, 17 Sep 2013, *Sorrie 13241* (NCU).

+$ *Bidens trichosperma* (Michx.) Britt. Known from three populations recently discovered on the Dare mainland, including: Mashoes Marshes, locally common at roadside marsh, 16 Sep 2013, *Sorrie 13115* (NCU). There are two historical records from Tyrrell County.

+ *Carphephorus bellidifolius* (Michx.) Torrey & Gray. Roanoke Island, edge of loblolly pine-oak woods, Victor Meekins Road NW of Manteo, 11 Jul 2012, *Sorrie 13039* (NCU). Plants were numerous and grew with more than twenty species normally associated with longleaf pine uplands; the site appears to be a highly disturbed, remnant, pine-oak community.

+ *Liatris pilosa* (Ait.) Willd. First known collection: Kitty Hawk, *Bandle 453* (ODU) as cited by Krings (2010). It was reported from Nags Head Woods by Stalter and Lamont (1997) and is rare in sandy, dry oak-pine woods at Wright Brothers Memorial, 17 Sep 2013, sight record.

Liatris spicata (L.) Willd. var. *resinosa* (Nutt.) Gaiser. First known collection: edge of sapling cypress swamp on hwy 345, 3¾ mi N of Wanchese, Roanoke Island, 21 Sep 1940, *Radford & Stewart 884* (NCU). It is now locally common in moist clay-sand soil beside NC 345, 1 mi N of Wanchese, 8 Oct 2013, *Sorrie 13272* (NCU). Here plants grew with *Paspalum floridanum, P. praecox, Ionactis linariifolia, Hypericum cistifolium, Symphyotrichum simmondsii, Quercus marilandica*, and other species rare in Dare County.

Solidago arguta Ait. var. *caroliniana* A. Gray. Examination of specimens and additional field work confirm that all outer Coastal Plain plants of *S. arguta* are referrable to var. *caroliniana*, with its

much smaller and narrower basal leaves, narrower stem leaves, glabrous leaves, and strigillose cypselae. First known collection: Roanoke Island, open woods, Fort Raleigh, 31 Jul 1959, *Schallert 1960* (NCU). It is local in Maritime Deciduous Forest and Maritime Evergreen Forest in Jockey's Ridge State Park, Nags Head Woods, and Kitty Hawk Woods.

+ *Solidago petiolaris* Ait. First known collection: Nags Head Woods, Sep 1974, *Peterson s.n.* (CAHA). More recent collections, all from the same site, are several by Krings (cited in Krings 2010), and along Old Nags Head Woods Road, 31 Oct 2013, *Sorrie 13284* (NCU). Dare County is the northernmost range limit.

+ *Symphyotrichum simmondsii* (Small) Nesom. First known collection: Hatteras Island, 3 mi W of Old Cape Hatteras lighthouse, freshwater ponds and swales, 15 Oct 1940, *Fosberg 17970* (NCU). It occurs as scattered plants in Interdune Marshes S of Buxton Woods, 24 Oct 2012, *Sorrie 13127* (NCU), and also found in a moist grassy Interdune Marsh at the base of high dunes, Jockey's Ridge State Park, 30 Oct 2013, *Sorrie 13278* (NCU, NCSC). This species was not known to be a member of the North Carolina flora until Nesom annotated specimens from *S. dumosum* (L.) Nesom at NCU.

BETULACEAE

+ *Betula nigra* L. Discovered in a thicket of *Quercus virginiana* P. Miller and *Ilex vomitoria* Ait. beside Albemarle Sound, Corps of Engineers Research Facility N of Duck, several small trees, 26 Jun 2013, *Sorrie 13208* (NCU). This riparian species is undoubtedly adventive here.

CARYOPHYLLACEAE

Silene gallica L. First known collection: roadside between Hatteras and Buxton, 6 Jun 1959, *Burk b6-7* (NCU). Burk (1961) noted that it also occurred on Bodie Island. Today this alien is restricted to the same area, all south of Nags Head town, in open Stable Dune Barrens, Maritime Dry Grasslands, and roadsides (*Sorrie 12944* CAHA, NCU). It also was collected from Ocracoke Island, Hyde County, in 2005 (*LeBlond 6096* NCU).

+ *Stipulicida setacea* Michx. First recorded by M. Schafale, M. Buchanan, and S. Strickland on 2 Jul 2010 from a Stable Dune Barren at Wright Brothers Memorial (NCNHP database). It is also recorded on the Jockey's Ridge State Park plant list, and confirmed there in 2013: edge of live oak-loblolly pine woodland, 100+ plants, 28 Jun 2013, *Sorrie 13223* (NCU).

CISTACEAE

+$ *Crocanthemum carolinianum* (Walt.) Spach. Discovered in a Stable Dune Barren with *Hudsonia tomentosa* Nutt. and *Lechea maritima* Leggett ex B.S.P. var. *virginica* Hodgdon, Kitty Hawk Woods, 2 May 2013, *Sorrie 13153* (GH, NCSC, NCU). This represents a new northern range limit.

$ *Crocanthemum georgianum* (Chapm.) Barnhart. First known collection: open sandy spots, Cape Hatteras, Jun-Jul 1898, *Ashe s.n.* (NCU). It was recently documented as locally common on roadsides and disturbed areas, Lighthouse Road, Buxton, 1 Jun 2013, *Sorrie 13192* (CAHA, NCU).

CLADONIACEAE

+# *Cladina evansii* (Abbayes) Hale & Culb. This distinctive lichen is locally common in xeric sand of sand laurel oak-loblolly pine woods at Wright Brothers Memorial, 17 Sep 2013, *Sorrie 13243* (NCU). This represents a new northern range limit.

CONVOLVULACEAE

Calystegia soldanella (L.) R. Br. ex Roem. & Schult. There are no specimens at NCU nor NCSC to support the report in Radford, Ahles, and Bell (1968). Stalter and Lamont (1997) reported it from "ocean dunes near Kitty Hawk." Krings and I found it to be rare and local on a foredune at Cape Hatteras Point, 19 Sep 2013, *Sorrie 13254* (NCU). This species is considered non-native in North Carolina by Weakley (2012) and in Virginia by Weakley, Ludwig, and Townsend (2012).

CYPERACEAE

+ *Carex arenaria* L. This alien sedge was previously known from Carolina Beach State Park in New Hanover County, North Carolina, and also eastern Maryland and southeastern Virginia (Weakley 2012). A single Dare County specimen exists: no location, 30 Jul 1990, *Stalter & Lamont s.n.* (CAHA 2664).

+$ *Carex basiantha* Steud. First known collection: Nags Head, Apr 1898, *Ashe s.n.* (NCU). This specimen lay unidentified until 2011.

$ *Carex calcifugens* Naczi. First known collection: near Cape Hatteras, 16 Jun 1898, *Ashe s.n.* (NCU). This maritime and near-maritime species proves to be frequent in Maritime Evergreen Forest and Maritime Deciduous Forest from Buxton Woods north to Kitty Hawk Woods. Recent collections include: Nags Head Woods, 19 Apr 2012, *Sorrie 12929* (GH, NCSC, NCU, NY) and Buxton Woods, 15 May 2012, *Sorrie 12946* (CAHA, MO, NCU). Dare County is the species' northern limit.

+*$ *Carex canescens* L. var. *disjuncta* Fernald. First known collection: Tyrrell County, swamp on E side of SR 1105, with *Carex stricta*, 23 Apr 1984, *Leonard 8363* (FSU). Robust tussocks occurred at the same site in 2012 (*Sorrie 12915* NCSC, NCU) and along NC 94 well to the south (*Sorrie 12920* NCSC, NCU). It also was found in Tyrrell County on a Floating Bog along New Lake Fork of Alligator River, 30 May 2013, *Sorrie 13177* (NCU, NY). On the Dare County mainland, it was common along Milltail Creek, 29 May 2013, *Sorrie 13172* (NCU).

Carex kobomugi Owhi. This alien was reported from Bodie Island, "coastal dunes and swale at campground N of Oregon Inlet" by Stalter and Lamont (1997), but their specimen has not been located. Three collections from here and elsewhere on Bodie Island (CAHA 1310, 4575, 4733) all prove to be *C. pumila* Thunb. Thus there is no verified record of *Carex kobomugi* in North Carolina south of Currituck County.

Carex pumila Thunb. First known collection: Hatteras Island, 1959, *Burk b49-18* (NCU). Recent collections suggest that this alien is spreading: Bodie Island, Cape Hatteras National Seashore, 100 meters S of Whalebone Junction, 19 May 1992, *Reznicek 8935* (NCU); locally common on backside of foredune, Coquina Beach, Cape Hatteras National Seashore, 31 May 2013, *Sorrie 13184* (NCU); and on backdunes at Corps of Engineers Research Facility N of Duck, 26 Jun 2013, *Sorrie 13204* (NCU).

+# *Cyperus surinamensis* Rottb. First known North Carolina collection: New Hanover County, Silver Lake, 16 Aug 2002, *LeBlond 5668* (NCU). In Dare County it was common in road margins at Cape Hatteras Point campground, Cape Hatteras National Seashore, 12 Jun 2012, *Sorrie 13009* (CAHA, NCU). Weakley (2012), unaware of the NC specimens, has treated it as native in southern South Carolina. I suggest treating the North Carolina populations as adventive, as there are no occurrences in any natural Maritime Wet Grassland communities — habitats where this species would be expected to grow.

+$ *Cyperus tetragonus* Ell. First recorded by A. Weakley along Flowers Ridge Road, Buxton, 13 Nov 1987 (NCNHP database). This tall flatsedge is frequent along trails and on slopes in Maritime Evergreen Forest in Buxton Woods, 16 Aug 2012, *Sorrie 13077* (CAHA, NCU). This represents a new northern range limit.

$ *Eleocharis cellulosa* Torrey. First known collection: 3 mi W of Cape Hatteras lighthouse, ponded swale, 15 Oct 1940, *Fosberg* (NCU). It is the dominant plant here, covering a few hectares, 19 Sep 2012, *Sorrie 13102* (CAHA, NCU); and also locally common on mainland Dare County along Mashoes Road at the edge of a Tidal Freshwater Marsh, 16 Sep 2013, *Sorrie 13233* (NCSC, NCU).

+ *Eleocharis fallax* Weatherby. This species included *E. ambigens* Fernald in Radford, Ahles, and Bell (1968). The discovery of large populations of this rare and little known species in 2012 and 2013, and its distinctiveness from *E. ambigens*, are discussed in a separate paper (Sorrie & LeBlond 2014). Dare County records are from Interdune Marshes and Maritime Wet Grasslands, vouchered by *Sorrie 12995* (NCU), *13002* (CAHA, NCU), and *13187* (GH, NCU). LeBlond collected it in 1996 from Onslow County in a Tidal Red Cedar Forest (cited in Sorrie and LeBlond 2014). These records represent a new southern range limit.

+$ *Eleocharis montevidensis* Kunth. First known collection: in wet meadows, Cape Hatteras, 16 Jun 1898, *Ashe s.n.* (NCU), specimen originally misidentified as *E. tricostata* Torrey. It occurs at margins of Maritime Wet Grasslands between Frisco and Buxton, 15 May 2012, *Sorrie 12948* (CAHA, NCU). This represents a new northern range limit.

+ *Fuirena breviseta* (Coville) Coville ex Harper. In Radford, Ahles, and Bell (1968) this species was synonymized under *F. squarrosa* Michx. First known collection: Roanoke Island, freshwater marsh 0.5 mi N of Wanchese, 2 Sep 1959, *Crutchfield 4694* (NCU).

*$ *Isolepis carinata* Hook. & Arn. ex Torrey. Discovered new to Tyrrell County in the moist grassy bed of Davis Canal Road W of NC 94, 18 Apr 2012, *Sorrie 12919* (NCSC, NCU). Here it is disjunct at least 220 km from the nearest North Carolina collections in Durham and Pender counties.

+ *Kyllinga gracillima* Miquel. Discovered new to Dare County by Clark et al. (in press): moist edge, Kitty Hawk Woods, *Clark 370* (NCSC). Also local on a moist grassy roadside and margin of Tidal Freshwater Marsh, with *Bidens trichosperma*, Mashoes Road, 16 Sep 2013, *Sorrie 13231* (GH, NCSC, NCU). This species, also known as *Cyperus brevifolioides* Thieret & Delahoussaye, was previously known in North Carolina only from two mountain counties but recorded in South Carolina from Charleston County and "infrequent throughout" Virginia (Weakley, Ludwig, & Townsend 2012).

$ *Rhynchospora microcarpa* Baldwin ex A. Gray. First known collection: 3 mi W of Old Cape Hatteras lighthouse, freshwater swale, 15 Oct 1940, *Fosberg 17987* (NCSC). Scattered plants inhabit wet exposed soil of Interdune Marshes S of Buxton Woods, 19 Sep 2012, *Sorrie 13105* (NCSC, NCU) and 24 Oct 2012, *Sorrie 13125* (GH, NCU). This represents a new northern range limit.

+$ *Rhynchospora odorata* C. Wright ex Griseb. Several populations inhabit Maritime Wet Grasslands in the vicinity of Cape Hatteras Point, with *Rhynchospora colorata* (L.) H. Pfeiffer, *Scleria verticillata* Muhl. ex Willd., *Dichanthelium neuranthum* (Griseb.) LeBlond, and *D. caerulescens* (Hackel ex Hitchc.) Correll, 11 Jun 2012, *Sorrie 12994* (CAHA); 19 Sep 2012, *Sorrie 13109* (NCU); and 25 Oct 2012, *Sorrie 13128* (NCSC). This represents a new northern range limit.

+$ *Schoenoplectus etuberculatus* (Steud.) J. Sojak. Collected from a "small shallow wetland just N of Jennette Sedge, with *Eleocharis montevidensis* and *Nymphaea odorata,*" 12 Jul 1984, *Gaddy 253* (CAHA 1314).

Scleria flaccida Steud. In Radford, Ahles, and Bell (1968) this species was synonymized under *S. triglomerata* Michx. First known collection: sandy openings in woods of *Pinus taeda* and *Quercus virginiana*, Peter's Bridge, Hatteras Island, 14 Oct 1940, *Fosberg 17874* (NCU). LeBlond (in Weakley 2012) recognized this robust, broad-leaved taxon of the outer Coastal Plain as distinct from *S. triglomerata*, and I concur, as it has a more robust gestalt, different habitat, and maritime/near-maritime range. It is frequent to common in dry to mesic Maritime Evergreen Forest in Buxton Woods, apparently the northern range limit: 15 May 2012, *Sorrie 12945* (CAHA, NCU).

*$ *Scleria verticillata* Muhl. ex Willd. Discovered new to Tyrrell County in the wet margin of route 94, S of Northwest Fork of Alligator River, 13 Aug 2012, *Sorrie 13065* (NCSC, NCU). It is also documented from several populations in Maritime Wet Grasslands in the vicinity of Cape Hatteras Point, Dare County (NCNHP database).

EQUISETACEAE

+ *Equisetum arvense* L. First known collection: Tyrrell County, roadside, New Lake Fork of Alligator River near NC 94, 18 May 1958, *Radford 33891* (NCU). Elsewhere in Tyrrell it is common at the edge of a Nonriverine Swamp Forest, Grapevine Landing Road, 13 Aug 2012, *Sorrie 13061* (NCU). In Dare County, it is known only from moist sandy woods margin, W of the Navy Bombing Range, 26 Apr 1984, *Leonard 8375* (NCU).

ERICACEAE

+# *Gaylussacia bigeloviana* (Fernald) Sorrie & Weakley. In Radford, Ahles, and Bell (1968) this taxon was synonymized with *G. dumosa* (Andrews) Torrey & Gray. First known collection: pocosin on US 264, near Manns Harbor, 23 May 1954, *Radford 8200* (NCU). A recent collection is from a Low Pocosin NE of Pain's Creek, 15 Jun 2012, *Sorrie 13021* (GH, NCSC, NCU). It is an uncommon inhabitant of Low Pocosins in peatlands of Bladen, Brunswick, Carteret, Dare, and Pender counties, North Carolina, and at a streamhead seepage swamp in Lexington County, South Carolina. These southernmost stations are disjunct from southern Delaware.

EUPHORBIACEAE

+$ *Euphorbia ammanoides* Kunth. Reported from Bodie Island by Johnson (1992, as *Chamaesyce ingallsii* Small), but it is unclear if specimens were taken. It is frequent in stable and semistable sand of Dune Grass and Maritime Dry Grassland communities on Bodie and Hatteras Islands, where it far outnumbers *E. polygonifolia* L.: 18 Sep 2012, *Sorrie 13093* (CAHA, NCSC, NCU); same date, *Sorrie 13100* (CAHA, GH, NCU).

FABACEAE

+ *Lotus corniculatus* L. The first known report is by Stalter and Lamont (1997): "roadside N of Rodanthe, rare." It is now common and spreading on Hatteras Island along NC 12 S to Buxton: 31 May 2013, *Sorrie 13185* (NCSC, NCU).

+ *Sesbania herbacea* (P. Mill.) McVaugh. Some 40 fruiting plants were found at the junction of Long Curve Road and Lake Worth Road, Stumpy Point, 1 Nov 2013, *Sorrie 13287* (NCU).

IRIDACEAE

$ *Iris prismatica* Pursh ex Ker Gawl.. First known collections: ditch on NC 345, 1.5 mi S of Manteo, 16 May 1959, *Crutchfield 3569* (NCU); Wanchese Road [NC 345], wet area, 19 May 1976,

Dunes of Dare Garden Club s.n. (CAHA 966). A few plants still occur here in a roadside ditch, 31 May 2013 (NCNHP database).

Iris verna L. var. *verna*. First known collection: Roanoke Island, roadside ditch 1.7 mi N of Manteo, 17 Apr 1959, *Crutchfield 2997* (NCU). This remains the only collection from off the mainland of North Carolina.

\+ *Sisyrinchium angustifolium* P. Mill.. First known collection: common in Maritime Wet Grassland, Jockey's Ridge State Park, 29 Apr 2013, *Sorrie 13141* (NCSC, NCU). It was also seen in an Interdune Marsh in Buxton and a Maritime Wet Grassland near Frisco, both in 2012.

+* *Sisyrinchium rosulatum* Bickn. Burk (1961) reported it from Hatteras Village, but the specimen (*Burk b45-10*, NCU) actually is *S. atlanticum* Bickn. Crutchfield (1964) reported it (as *S. brownei* Small) from a roadside in Wanchese (*Crutchfield 3611*), but the specimen is not at NCU. First known Dare County collection: along route 12 between Whalebone Junction and Oregon Inlet, 19 May 1985, *Davison s.n.* (CAHA 1051). First known Tyrrell County collection: grassy roadside of SR 1117, 17 Apr 2012, *Sorrie 12911* (NCSC, NCU). Today this species is frequent on roadsides and lawns throughout both counties.

LAMIACEAE

$ *Pycnanthemum setosum* Nutt. First known collection: Tyrrell County, freshwater marsh near NC 94, 3.1 mi S of Kilkenny, 6 Aug 1958, *Radford 39276* (NCU). Recent Tyrrell collections are from Cove Landing Road, 25 Jun 2013, *Sorrie and Jackson 13202* (NCU); and marshy ditch by US 64, E of Columbia, 16 Sep 2013, *Sorrie 13230* (NCU).

+* *Stachys floridana* Shuttlew. ex Benth. First known collection: Dare County, edge of Doctor's Hill Road, Buxton Woods, 15 May 2012, *Sorrie 12955* (NCU). In Tyrrell County, seen in flower along Bee Tree Trail, Pettigrew State Park, 28 May 2013. This alien species was unknown in North Carolina when Radford, Ahles, and Bell (1968) was published, but now is scattered across the state.

PHYTOLACCACEAE

+# *Phytolacca rigida* Small. This taxon was not recognized by Radford, Ahles, and Bell (1968). First known collection: waste place, Buxton Woods, *Radford 7565* (NCU). It occurs sporadically in Dare County from Buxton north to Duck, where a collection was made from a roadside on the S side of town, 17 Sep 2012, *Sorrie 13092* (NCU).

PINACEAE

\+ *Pinus nigra* Arn. Prior reports of *P. pinaster* Ait. and *P. thunbergiana* Franco (Burk 1961; Weakley 2012) are not substantiated by vouchers at NCU. Using the key in Haines (2011), specimens collected from the large plantation on Hatteras Island south of Salvo prove to be *P. nigra* (*Sorrie 13186* NCU; *13218* NCU). The cones are sessile and the shoot tips are viscous-sticky, characters in line with *P. nigra*. Additional plantings and escaped individuals occur north to Southern Shores.

PLANTAGINACEAE

+$ *Limosella australis* R. Br. First known collection: marsh on Currituck Sound near Caffey's Inlet, 3 Jun 1951, *Radford 5756* (NCU). The specimen label says Currituck County, but Caffey's Inlet straddles the line and the old Life Saving Station was actually in Dare County. It is reported as occurring at Jockey's Ridge State Park (park list of plants).

POACEAE

Aira praecox L. First known collection: roadside, Hatteras Village, 12 May 1960, *Burk b45-27* (NCU). At the time, this was the sole record for North Carolina. A second collection was made in the 1980s on Bodie Island: *Davison s.n.* (CAHA 3854). Recently it was collected on a roadside near Coquina Beach, Bodie Island, 31 May 2013, *Sorrie 13183* (CAHA, NCU). This inconspicuous and epemeral alien is likely more widespread.

+ *Andropogon glaucopsis* Ell. This species was synonymized within *A. virginicus* L. in Radford, Ahles, and Bell (1968). First known collection: Roanoke Island, edge of pine stand 0.3 mi N of Wanchese, 17 Oct 1959, *Crutchfield 5128* (NCU). It was mapped for Tyrrell County by Blomquist (1948), the specimen presumably at DUKE. It is common on mainland Dare and Tyrrell counties in wet openings in Pond Pine Woodland, High Pocosin, and Low Pocosin. In Dare County, Outer Banks populations have been seen in Interdune Marshes and Maritime Wet Grasslands at Buxton Woods, Jockey's Ridge State Park, and Duck.

+* *Andropogon tenuispatheus* (Nash) Nash. [= *A. glomeratus* (Walter) B.S.P. var. *pumilus* Vasey ex Dewey]. This species was synonymized within *A. virginicus* L. in Radford, Ahles, and Bell (1968). All collections from the Outer Banks that were originally determined to be *A. glomeratus* (NCU, NCSC) are instead *A. tenuispatheus*, due to: plant taller, inflorescence longer, inflorescence with more branches, inflorescence branch clusters curved or rounded distally (vs. flat-topped or truncate), shorter ligules, shorter raceme sheaths, and maritime/near maritime habitats (vs. freshwater seepage slopes and wet pine savannas). First known collection: sand flat at Avon, 10 Oct 1953, *Radford 7745* (NCU). It is *A. tenuispatheus*, and not *A. glomeratus* sensu stricto, which is colonizing inland roadsides and fields throughout the South.

+# *Aristida lanosa* Muhl. ex Ell. First known collection: top of stable dune behind live dune, Nags Head forest, 22 Oct 1960, *Burk b58-15* (NCU). This specimen was originally misidentified as *A. condensata* Chapm. Recently it was collected in Nags Head Woods by Krings (*2421 and 2422* NCSC).

+ *Bromus rigidus* Roth. First known collection: Buxton, sandy roadside near Orange Blossom Bakery, 20 Jul 1989, *Davison s.n.* (CAHA 3859). This alien was collected recently on a disturbed margin of Old Doctor's Road, Buxton, 15 May 2012, *Sorrie 12957* (NCSC, NCU). Many plants were also noted in disturbed sand at the Corps of Engineers Research Facility north of Duck, 26 Jun 2013.

+# *Chasmanthium sessiliflorum* (Poir.) Yates. First known collection: mixed hardwoods, Kitty Hawk, 4 Aug 1966, *Radford & Pence 45097* (NCU). It is abundant in Maritime Evergreen Forest in Buxton Woods, *Sorrie 13034* (CAHA, NCSC, NCU, US) and locally common in Maritime Deciduous Forest in Kitty Hawk Woods, *Sorrie 13239* (NCU).

+ *Cortaderia selloana* (J.A. & J.H. Schult.) Asch. & Graebn. This alien is widely planted in the state but rarely reported as escaped or established. Plants can be found in scattered roadside and open woodland locations from Buxton to Hatteras Village (sight records).

+* *Dichanthelium arenicoloides* (Ashe) LeBlond comb. nov. in prep. This species was not recognized at any rank within *Panicum* in Radford, Ahles, and Bell (1968). First known collection: open place near Fort Raleigh, Roanoke Island, 30 Jul 1959, *Schallert 5023* (NCU). It was mapped for Tyrrell and Currituck counties by Blomquist (1948) and the specimens presumably are at DUKE. Plants form distinctive circular mats similar to *D. aciculare* (Desv. ex Poir.) Gould & Clark, but with longer leaves and longer spikelets. It is common in open Stable Dune Barrens throughout the Outer Banks. Recent collections include the Corps of Engineers Research Facility N of Duck, 11 Jul 2012,

Sorrie 13036 (NCU); Stable Dune Barrens at Wright Brothers Memorial, 15 Aug 2012, *Sorrie 13072* (NCSC, NCU); and dunes just S of Buxton Woods, 24 Oct 2012, *Sorrie 13122* (CAHA, NCU).

Dichanthelium boscii (Poir.) Gould & Clark. First known collection: Nags Head Woods, Jun 1950, *Fox and Godfrey 2316* (NCSC). Recently collected from mesic slopes in Buxton Woods, 27 Jun 2013, *Sorrie 13213* (NCSC, NCU). It is frequent in Maritime Deciduous Forest and Maritime Evergreen Forest at Buxton Woods, Nags Head Woods, and Kitty Hawk Woods.

+$ *Dichanthelium caerulescens* (Hackel ex Hitchc.) Correll. This species was not recognized at any rank within *Panicum* in Radford, Ahles, and Bell (1968). First known collection: marsh at Cape Hatteras, 26 Aug 1953, *Radford 7627* (NCU). There are 9 current populations in Dare County, all from Maritime Wet Grasslands on Hatteras and Pea Islands (NCNHP database). Collections include Pea Island National Wildlife Refuge, swale behind dunes, 4 Jun 2003, *Carolina Vegetation Survey* (NCU); Cape Hatteras Point campground, 12 Jun 2012, *Sorrie 13003* (NCU); and beach access ramp 49 E of Frisco, 19 Sep 2013, *Sorrie 13256* (CAHA, DUKE, NCU, NY).

+$ *Dichanthelium fusiforme* (Hitchc.) Harvill. First known collection: Run Hill, top of dune, about 205 meters W of junction of Tenth Street and West Corrigan Street, 14 Sept 2009, *Carolina Vegetation Survey* (NCU).

+$ *Dichanthelium neuranthum* (Griseb.) LeBlond. First known collection: interdune swale N of Avon, 5 Jun 2003, *Carolina Vegetation Survey* (NCU). There are six current populations in Dare County, all from Maritime Wet Grasslands on Hatteras Island (NCNHP database); e.g., swale by Billy Mitchell Airfield, 16 Aug 2012, *Sorrie 13076* (CAHA, NCU).

+ *Eragrostis mexicana* (Hornem.) Link var. *mexicana*. South Nags Head near milepost 18, between highway and beach, single large clump, 10 Jul 1989, *Ludwig 1018* (NCU). This collection is the first for North Carolina for this alien.

+ *Eragrostis secundiflora* J. Presl subsp. *oxylepis* (Torrey) S.D. Koch. Locally common in disturbed sandy roadsides at former Little Kinnakeet Coast Guard Station, Hatteras Island, 18 Sep 2012, *Sorrie 13099* (CAHA, NCSC, NCU). It is considered to be alien in North Carolina.

+* *Eremochloa ophiuroides* (Munro) Hackel. The first report from Dare County is from the 1990s at Jockey's Ridge State Park (JRSP plant list). Today it is common along US 64, NC 12, and NC 158 in Dare and Tyrrell counties (*Sorrie 13229* NCU; *13259* CAHA, NCU).

* *Festuca subverticillata* (Pers.) Alexeev. First known collection: Dare, abandoned home, Wanchese, 31 May 1959, *Crutchfield 3642* (NCU). Discovered new to Tyrrell at Pettigrew State Park in a Natural Lake Shoreline Swamp, 28 May 2013, *Sorrie 13168* (NCU).

+ *Heteropogon melanocarpus* (Ell.) Ell. ex Benth. First known collection: Roanoke Island, 16 Oct 1950, *Schallert 3752* (NCU). Radford, Ahles, and Bell (1968) recorded it from New Hanover County, North Carolina, and 3 counties from southern South Carolina. The Dare County specimen has no habitat data but is almost certainly adventive.

+* *Hymenachne hemitomon* (J.A. Schult.) C.C. Hsu [formerly *Panicum hemitomon*]. In Dare County, this grass forms remarkable floating mats along Milltail Creek, anchored to soil only at the shoreward side, the culms intertwined and forming mats up to 5 m wide x 50 m long, 29 May 2013, *Sorrie 13173* (GH, NCSC, NCU, US). In Tyrrell County it is occasional at the edge of a Floating Bog along New Lake Fork of Alligator River.

+*$ *Luziola fluitans* (Michx.) Terrell & H. Robinson. Locally abundant in roadside ditches along NC 94 in Tyrrell County, 13 Aug 2012, *Sorrie 13066* (NCSC, NCU); also in similar ditches along US 264 in Dare County (NCNHP database).

+* *Microstegium vimineum* (Trin.) A. Camus. First known specimen: Nags Head Woods, 1991, *Stalter 61* (CAHA 2064). More recent specimens were collected there by Krings (cited in Krings 2010). It is locally common in moist soil bordering Interdune Marshes and Interdune Ponds at Nags Head Woods, Kitty Hawk Woods, and Buxton Woods; also in a Natural Lake Shoreline Swamp at Pettigrew State Park in Tyrrell County.

$ *Oplismenus hirtellus* (L.) Beauv. subsp. *setarius* (Lam.) Mez ex Ekman. Mapped for Dare County by Blomquist (1948) and Radford, Ahles, and Bell (1968). First known specimen: sands at Cape Hatteras, 21 Oct 1955 *Radford and Browne, Jr. 8783* (NCU). It is locally common in Maritime Evergreen Forest, Buxton Woods, 20 Sep 2012, *Sorrie 13111* (CAHA, NCSC, NCU). This represents its northern range limit.

+* *Panicum virgatum* L. var. *spissum* Linder. This variety was not recognized by Radford, Ahles, and Bell (1968). First known collections: Dare County, landward side of Hatteras Island near Pea Island, 7 Aug 1954, *Silliman and Munson s.n.* (NCU); Tyrrell County, ditch near NC 94 and Alligator River, 6 mi N of Kilkenny, 6 Aug 1958, *Radford 39225* (NCU). In North Carolina these plants inhabit brackish marshes and their edges, have caudex-like rhizomes, spikelets range from 3.6-4.0 mm, first glumes range from 2.4-3.0 mm, and spikelets have longer, more attenuated tips than those of var. *cubense* Griseb. Thus, they match plants of var. *spissum* as described by Linder (1922) and match specimens from Maryland northward. Var. *cubense* is commonly found across the Coastal Plain in fresh water seepage slopes and wet pine savannas, disjunct to montane seepage bogs. The nominate variety is known in the state only from a few scattered collections from highly disturbed habitats and may not be native in North Carolina. Heretofore, var. *spissum* was documented to occur south to Delaware and Maryland (Weakley 2012). Recent collections include: Dare County, common on low dike through brackish marsh, Point Peter Road, 12 Jul 2012, *Sorrie 13143* (NCU); Tyrrell County, common at roadside edge of brackish marsh, Alligator River at NC 94, 14 Aug 2012, *Sorrie 13068* (NCU).

Paspalum praecox Walt. First known collection: not available at this time; NCU specimens are currently on loan. It was mapped in Dare and Tyrrell counties by Blomquist (1948), but only Dare County by Radford, Ahles, and Bell (1968). It is uncommon at a roadside moist with seepage, N of Wanchese, Roanoke Island, 8 Oct 2013, *Sorrie 13269* (NCSC).

+$ *Paspalum vaginatum* Swartz. Mapped as far north as Hyde County by Blomquist (1948) and Radford, Ahles, and Bell (1968). It was collected in Dare County from a Maritime Wet Grassland near Cape Hatteras Point campground, 9 Jul 2012, *Sorrie 13025* (CAHA, NCU). This represents a new northern range limit.

+# *Schizachyrium littorale* (Nash) Bickn. This taxon was synonymized under *Andropogon scoparius* Michx. in Radford, Ahles, and Bell (1968), but its distinctiveness was clarified by Bruner (1987). First known collection: 6 mi N of Whalebone Junction, 19 Sep 1974, *McCaffrey s.n.* (FLAS). Weakley (2012) stated that it is absent from the Outer Banks north of Hyde County, but in fact it is locally dominant on stable and semi-stable dunes at Buxton, Jockey's Ridge State Park, Nags Head Woods, and northward.

Sorghastrum elliottii (Mohr) Nash. First known collection: Buxton Woods, 1940, *Fosberg 17836* (DUKE). It is known only from Maritime Evergreen Forest at Buxton (*Sorrie 13123* CAHA,

NCU) and several places in Maritime Deciduous Forest at Nags Head Woods (*Krings 1210 and 1322* NCSC).

Sphenopholis nitida (Biehler) Scribner. First known collection: maritime forest 1.5 mi N of Kitty Hawk, 22 May 1954, *Radford 8085* (NCU). Recently it was collected from Maritime Deciduous Forests at Nags Head Woods, 19 Apr 2012, *Sorrie 12924* (NCSC, NCU, US) and at Kitty Hawk Woods, 2 May 2013, *Sorrie 13155* (NCU, US).

Sporobolus clandestinus (Biehler) Hitchc. First known collection: maritime forest, Kitty Hawk, 8 Oct 1961, *Radford 44486* (NCU). It was rediscovered there on 17 Sep 2013, *Sorrie 13237* (NCSC, NCU), growing in the company of *Sorghastrum elliottii, Tridens chapmanii, T. flavus,* and *Aristida lanosa.*

+ *Stenotaphrum secundatum* (Walt.) Kuntze. Locally common on the disturbed margin of Old Doctor's Road, Buxton Woods, 12 Jun 2012, *Sorrie 13001* (CAHA, NCU). While perhaps native in southeastern North Carolina and southward (Weakley 2012), the Dare County population is undoubtedly adventive.

+$ *Tridens chapmanii* (Small) Chase. First known collection: maritime forest at Duck, 21 Oct 1955, *Radford 8772* (NCU); specimen originally determined as *T. flavus*, annotated to *T. chapmanii* by R. LeBlond. It was uncommon at Kitty Hawk Woods, 17 Sep 2013, *Sorrie 13238* (NCU) and along Old Nags Head Woods Road, 31 Oct 2013, *Sorrie 13282* (NCSC, NCU). In North Carolina, these populations are disjunct some 300 km from Bladen County and from the Sandhills of the inner Coastal Plain.

POLYGONACEAE

+ *Persicaria longiseta* (de Bruijn) Kitagawa. First discovered at Dare Bombing Range, wet ditch along Bluewing Road, 1 Nov 2013, *Sorrie 13285* (NCU, NCSC); also seen on moist roadsides of Covered Bridge Road, Kitty Hawk Woods, 31 Oct 2013. This invasive alien was first collected in North Carolina in 1958 in two mountain counties and has now spread across the state.

RANUNCULACEAE

$ *Clematis catesbyana* Pursh. [*C. ligusticifolia* Nutt. ex Torrey & Gray] First known collection: depression between dunes, Duck, 28 Aug 1952, *Radford 6601* (NCU). This species has been known from the Duck area ever since, collected there in a disturbed, wooded roadside, 17 Sep 2012, *Sorrie 13091* (NCSC, NCU). A small population was found in Maritime Evergreen Forest in Buxton, 11 Jun 2012, *Sorrie 12993.1* (NCU).

ROSACEAE

Amelanchier canadensis (L.) Medik. Examination of specimens and additional field work by Krings (2010) confirm that all Outer Banks records of *A. arborea* (Michx. f.) Fern. and *A. obovalis* (Michx.) Ashe actually are *A. canadensis*. First known collection: Roanoke Island, shore of Albemarle Sound S of ferry landing, 18 Mar 1938, *Totten s.n.* (NCU). Plants are uncommon and sporadic in Maritime Forests at Nags Head Woods, Kitty Hawk Woods, and Buxton Woods (specimens cited by Krings 2010 and Clark et al. in press).

RUBIACEAE

+ *Galium orizabense* Hemsl. subsp. *laevicaule* (Weatherby & S.F. Blake) Dempster. Discovered in Maritime Evergreen Forest at Buxton, 11 Jun 2012, *Sorrie 12992* (NCU). A few other populations have been found along the main east-west ridge through Buxton Woods. These are the

northernmost extant populations; historically it was collected from Pasquotank County, North Carolina, and Brunswick County, Virginia (Weakley, Ludwig, and Townsend 2012).

+ *Galium uniflorum* Michx. Scattered in Maritime Deciduous Forest and Maritime Evergreen Forest from Buxton N to Kitty Hawk Woods. Collections include Nags Head Woods, 1 May 2013, *Sorrie 13148* (NCU) and Buxton Woods, 15 May 2012, *Sorrie 12953* (NCU).

SALICACEAE

+* *Populus heterophylla* L. Two trees were found in a small swamp along Covered Bridge Road, Kitty Hawk Woods, 31 Oct 2013, *Sorrie 13280* (NCU, NCSC). This is the sole Dare County and Outer Banks record. It also was seen in Nonriverine Wet Hardwood Forest in Tyrrell County at the Washington County line, 18 May 2012.

SMILACACEAE

+ *Smilax bona-nox* L. var. *littoralis* Coker ex Sorrie. This taxon was not included at any rank in Radford, Ahles, and Bell (1968). First known collection: sand dunes near Fort Raleigh, Roanoke Island, 3 Aug 1937, *Totten s.n.* (NCU). Coker (1944), in a study of woody *Smilax*, described var. *littoralis* as lacking spines on tubers and runners, aerial canes lacking scurfy surface trichomes, and inhabiting coastal dunes and scrub. In contrast, *S. bona-nox* var. *bona-nox* possesses spines on tubers and runners, has abundant whitish scurfy trichomes on aerial canes, and occurs inland in riverine floodplain forests. Specimens at NCU confirm var. *littoralis* from Brunswick, Pender, Carteret, Pamlico, Hyde, Dare, and Currituck counties, North Carolina (Sorrie 2014c). A collection from Northampton County, Virginia may be this variety: end of County Rd 662 on Ramshorn Bay, 5 Mar 1966, *James 3755* (NCU); it would represent the northernmost range limit. Var. *littoralis* is common in moist to xeric maritime sands in Dune Grass, Stable Dune Barren, Maritime Shrub, and Maritime Evergreen Forest communities throughout the Outer Banks of Dare County and also locally on Roanoke Island.

XYRIDACEAE

+ *Xyris ambigua* Beyr. ex Kunth. This yellow-eyed-grass was first reported from Dare County at Jockey's Ridge State Park (park plant list) and found to be numerous in moist grassy Interdune marshes at the bases of high dunes, 30 Oct 2013, *Sorrie 13277* (NCU). It was also collected from a wet roadside slope and ditch, NC 345, N of Wanchese, Roanoke Island, 18 Sep 2013, *Sorrie 13249* (NCU).

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LITERATURE CITED

Brown, C.A. 1957. Botanical reconnaissance of the Outer Banks of North Carolina. Techn. Report No. 8, Coastal Studies Institute, Louisiana State University, Baton Rouge.

Bruner, J.L. 1987. Systematics of the *Schizachyrium scoparium* (Poaceae) complex in North America. Ph.D. diss., Ohio State Univ., Columbus.

Burk, C.J. 1961. A Floristic Inventory of the Outer Banks of North Carolina. Ph.D. diss., Univ. of North Carolina, Chapel Hill, NC.

Clark, R.K., A. Krings, J.M. Stucky, and H.J. Kleiss. In press. Guide to the Vascular Flora of Kitty Hawk Woods, Dare County, North Carolina.

Coker, R.E. 1944. The woody smilaxes of the United States. J. Elisha Mitchell Sci. Soc. 60: 29–69.

Crutchfield, P.J. 1964. Taxa collected from Roanoke Island new to the flora of North Carolina. Castanea 29: 129–137.

Faucette, A., A. Krings, D.L. Lindbo, and J.M. Stucky. In prep. Guide to the vascular flora of Buxton Woods, Dare County, North Carolina.

Gadd, L.E. and J.T. Finnegan. 2012. Natural Heritage Program List of Rare Plant Species of North Carolina. North Carolina Natural Heritage Program, Raleigh.

Gaddy, L.L. 1985. Rare, endangered, threatened, and exotic plants of the Cape Hatteras National Seashore. Techn. Report No. 18, National Park Service Cooperative Park Studies Unit, Institute of Ecology, Univ. of Georgia, Athens.

Haines, A. 2011. Flora Novae Angliae. New England Wild Flower Society. Yale Univ. Press, New Haven, Connecticut.

Johnson, S.R. 1992. Observations on populations of *Chamaesyce polygonifolia* Small and *C. ingallsii* Small (*Euphorbia ammannioides* H.B.K.) on barrier islands of Virginia and North Carolina. Castanea 57: 291–292.

Krings, A. 2010. Manual of the Vascular Flora of Nags Head Woods, Outer Banks, North Carolina. Memoirs of the New York Botanical Garden, Vol. 103. Bronx, New York.

Levy, G.F. 1976. Vegetative study at the Duck Field Research Facility, Duck, North Carolina. Misc. Report No. 76–6, U.S. Army Corps of Engineers, Fort Belvoir, Virginia.

Linder, D.H. 1922. Some varieties of *Panicum virgatum*. Rhodora 24: 11–16.

McDonald, C.B. and A.N. Ash. 1981. Natural Areas Inventory of Tyrrell County, North Carolina. North Carolina Coastal Energy Impact Program, North Carolina Department of Natural Resources and Community Development, Raleigh.

Peacock, S.L. and J.M. Lynch. 1982. Natural Areas Inventory of Mainland Dare County, North Carolina. North Carolina Coastal Energy Impact Program, North Carolina Department of Natural Resources and Community Development, Raleigh.

Radford, A.E., H.E. Ahles, and C.R. Bell. 1968. Manual of the Vascular Flora of the Carolinas. Univ. of North Carolina Press, Chapel Hill.

Schafale, M.P. 2012. Classification of the Natural Communities of North Carolina. Fourth Approximation. North Carolina Natural Heritage Program, Raleigh.

Sorrie, B.A. 2014a. Natural Areas Inventory of Dare County, North Carolina. North Carolina Natural Heritage Program, Office of Land and Water Stewardship, Raleigh.

Sorrie, B.A. 2014b. Natural Areas Inventory of Tyrrell County, North Carolina. North Carolina Natural Heritage Program, Office of Land and Water Stewardship, Raleigh.

Sorrie, B.A. 2014c. The maritime variant of *Smilax bona-nox* (Smilacaceae). Phytoneuron 2014-16: 1–3.

Sorrie, B.A. and R.J. LeBlond. 2014. *Eleocharis fallax* (Cyperaceae): Recent collections and morphological comparison with *E. ambigens* and *E. montevidensis*. Phytoneuron 2014-8: 1–7.

Stalter, R. and E.E. Lamont. 1997. Flora of North Carolina's Outer Banks, Ocracoke Island to Virginia. J. Torrey Bot. Soc. 124: 71–88.

Weakley, A.S. 2012. Flora of the Southern and mid-Atlantic States. Draft of May 2012. Univ. of North Carolina, Chapel Hill.

Weakley, A.S., J.C. Ludwig, and J.F. Townsend. 2012. Flora of Virginia. BRIT Press, Fort Worth, Texas.